PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

INVITATION TO PAY ADDITIONAL FEES

(PCT Article 17(3)(a) and Rule 40.1)

To:
KONINKLIJKE PHILIPS ELECTRONICS
N.V.
Attn. Piotrowski, Daniel J.
Intellectual Property & Standards
P.O. Box 3001
Briarcliff Manor, NY 10510-8001
UNITED STATES OF AMERICA

Date of mailing *(day/month/year)*	11/03/2004

Applicant's or agent's file reference	PAYMENT DUE
PHUS020444WO	within 45 ~~months~~/days from the above date of mailing

International application No.	International filing date *(day/month/year)*
PCT/IB 03/05054	10/11/2003

Applicant

KONINKLIJKE PHILIPS ELECTRONICS N.V.

1. This International Searching Authority

   (i) considers that there are _____3_____ *(number of)* inventions claimed in the international application covered by the claims indicated ~~below~~/on the extra sheet:

   and it considers that the international application does not comply with the requirements of unity of invention (Rules 13.1, 13.2 and 13.3) for the reasons indicated ~~below~~/on the extra sheet:

   (ii) [X] has carried out a partial international search (see Annex)   [ ] will establish the international search report

   on those parts of the international application which relate to the invention first mentioned in claims Nos.:

   1-15, 17, 21, 22, 23

   (iii) will establish the international search report on the other parts of the international application only if, and to the extent to which, additional fees are paid

2. The applicant is hereby **invited,** within the time limit indicated above, to pay the amount indicated below:

   ___EUR 1.550,00___ x _____2_____ = ___EUR 3.100,00___
   Fee per additional invention   number of additional inventions   total amount of additional fees

   Or, _____ x _____ = _____

   The applicant is informed that, according to Rule 40.2(c), **the payment of any additional fee may be made under protest,** i.e., a reasoned statement to the effect that the international application complies with the requirement of unity of invention or that the amount of the required additional fee is excessive.

3. [ ] Claim(s) Nos. _____ have been found to be unsearchable under Article 17(2)(b) because of defects under Article 17(2)(a) and therefore have not been included with any invention.

Name and mailing address of the International Searching Authority	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Véronique Cornudet-Henschel

Form PCT/ISA/206 (July 1992)

1. The present communication is an Annex to the invitation to pay additional fees (Form PCT/ISA/206). It shows the results of the international search established on the parts of the international application which relate to the invention first mentioned in claims Nos.:
   1-15,17,21-23
2. This communication is not the international search report which will be established according to Article 18 and Rule 43.

3. If the applicant does not pay any additional search fees, the information appearing in this communication will be considered as the result of the international search and will be included as such in the international search report.

4. If the applicant pays additional fees, the international search report will contain both the information appearing in this communication and the results of the international search on other parts of the international application for which such fees will have been paid.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GHOBRIAL A ET AL: "Discrete wavelet transform domain adaptive decision feedback equalization" PROCEEDINGS OF THE THIRTY-FOURTH SOUTHEASTERN SYMPOSIUM ON SYSTEM THEORY, 18 March 2002 (2002-03-18), pages 243-247, XP010599096 Huntsville, AL, USA page 243, left-hand column, lines 11-21 of the Introduction page 245, left-hand column, Section III. C. page 245, left-hand-column, lines 1-5 of Section IV. A.	1,3-8, 14,15, 17,21-23
A		2,9-13
A	MODLIN C S ET AL: "A restructured decision feedback equalizer for facilitating the LMS algorithm" SIGNALS, SYSTEMS AND COMPUTERS, 1994. 1994 CONFERENCE RECORD OF THE TWENTY-EIGHTH ASILOMAR CONFERENCE ON PACIFIC GROVE, CA, USA 31 OCT.-2 NOV. 1994, LOS ALAMITOS, CA, USA,IEEE COMPUT. SOC, US, 31 October 1994 (1994-10-31), pages 1525-1529, XP010148832 ISBN: 0-8186-6405-3 page 1525, right-hand column, line 8 - page 1526, left-hand column, line 4	1-15,17, 21-23

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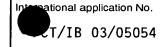
| X | Further documents are listed in the continuation of box C. | | Patent family members are listed in annex. |

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	GLENTIS G O ET AL: "Efficient Least Squares Adaptive Algorithms for FIR Transversal Filtering" IEEE SIGNAL PROCESSING MAGAZINE, vol. 16, no. 4, 1 June 1999 (1999-06-01), pages 13-41, XP002268696 page 20, right-hand column, Section Transform-Domain Decorrelation - page 21, right-hand column -----	1-15,17, 21-23

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This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-15, 17, 21, 22, 23

   Feedback filtering of a decision feedback equalizer in a transform domain

2. Claims: 16, 18

   Computing the step size of a transform domain least mean square algorithm

3. Claims: 19, 20

   Computing an orthogonal transform recursively

1.   These separate inventions are not so linked as to form a single general inventive concept, and the application suffers from both, an a-posteriori lack of unity (see PCT Guidelines, Gazette, Section IV, III 7.5) in the sense of Rule 13 PCT, for the following reasons:

2.   The following prior art document was found during the search and proved to be relevant for assessment of unity of the above cited (groups) of inventions.

D1:   GHOBRIAL A ET AL: "Discrete Wavelet Transform Domain Adaptive Decision Feedback Equalization", Proceedings Of The Thirty-fourth Southeastern Symposium On System Theory (18-03-2002), Huntsville, AL, U.S.A, pages 243-247

The document D1 discloses (the references in parentheses applying to this document) according to all features of claim 1,

a method for performing equalization on an input signal in a receiver (see page 243, left-hand column, lines 11-15 of the Introduction) comprising:
creating a plurality of delayed samples of the input signal (see page 245, left-hand column, step 2) of the description of the Transform domain LMS DFE and page 244, left-hand column, 2nd line after equation (2): an orthogonal transform T is computed of the input data vector yk,the creation of which requires a plurality of delayed samples of the input signal, and thus this feature is implicitly disclosed);
orthogonally transforming each of the plurality of delayed input samples (see page 245, left-hand column, step 2) of the description of the Transform domain LMS DFE);
weighting the plurality of orthogonally-transformed delayed input samples using a first corresponding plurality of transformed adaptive coefficients (see page 245, left-hand column, step 3) of the description of the Transform domain LMS DFE: the transformed delayed input samples Wk are weighted with the coefficient vector ck-1);
and summing the weighted plurality of orthogonally-transformed delayed input samples along with a feedback signal and outputting a result of the summing as an equalizer output signal (see page 245, left-hand column, step 3) of the description of the Transform domain LMS DFE: the

summing is disclosed in computing the scalar product of the coefficient vector ck-1 and the vector (Wk dk-1), where dk-1 is the feedback signal.

The technical features of dependent claims 14, 15, and 17 are also known from document D1.

It follows from a comparison of the present set of claims with document D1 that the following technical features could potentially make a contribution over this prior art, and as such may be regarded as special technical features in the sense of Rule 13.2 PCT:

- Invention 1. (Claim 2): orthogonally transforming each of the plurality of the delayed decision samples; weighting the plurality of orthogonally-transformed delayed decision samples using a second corresponding plurality of transformed adaptive coefficients; and summing the weighted plurality of orthogonally transformed delayed decision samples to create the feedback signal

- Invention 2. (Claims 16, 18): the adaptation step size in the transform domain is calculated as follows: 1=pM in which p is an average power of the input signal in a time-domain; and is an adaptation step size in the time-domain

- Invention 3. (Claim 19): said orthogonally transforming comprises computing a transform of each of a plurality of delayed input samples in a recursive manner by using a prior orthogonal transform of a prior one of the plurality of delayed input samples in a next orthogonal transform of a next one of the plurality of delayed input samples

A comparison reveals that there is no technical relationship among these inventions involving one or more of the same special technical features (Rule 13.2 PCT).

The objective technical problems which are solved by the special technical features of inventions 1., 2., 3. may be regarded as follows:

- Invention 1.: How to carry out the feedback filtering in a decision feedback equalizer in the transform domain

- Invention 2.: How to compute the step size of a transform domain least mean square algorithm from the step size of a corresponding time domain least mean square algorithm

- Invention 3.: How to compute an orthogonal transform in a recursive manner

The problems underlying inventions 1., 2. and 3. are completely unrelated to each other, and thus none of the potential special technical features of the three respective inventions may be regarded to function in an equivalent, or complementary, or cooperative manner, nor are they specially adapted to each other. Therefore, no corresponding special technical features in the sense of Rule 13.2 PCT can be ascribed

to the three invention 1., 2. and 3.

4.   The (group of) inventions 1., 2., and 3. are thus neither linked by a single general inventive concept, nor do they fulfil the requirement of Rule 13.2 PCT that an international patent application may include a group of inventions if there is a technical relationship among those inventions involving one or more of the same, or corresponding special technical features which make as a whole a inventive contribution to the state of the art.